Enterprise Technical Reference Model – Version 3.0

Effective Date: TBD

INTRODUCTION

The Enterprise Technical Reference Model (ETRM) provides an architectural framework used to identify the standards, specifications and technologies[1] that support the Commonwealth's computing environment. The ETRM uses the concepts of Domains, Disciplines, Technology Areas and Technology Specifications to define the enterprise architecture. This framework borrows from the National Association of State Chief Information Officers (NASCIO) Enterprise Architecture Tool Kit as well as the work done by the federal government's Federal Enterprise Architecture Program. The Commonwealth appreciates and has benefited from the foundational work conducted by NASCIO and the federal government in this area.

Many of the terms used in the ETRM are defined in the document itself. In addition, the following Internet dictionaries may be used to obtain definitions of unfamiliar technical terms:

- CMP Tech Web Encyclopedia - http://www.techweb.com/encyclopedia
- Loosely Coupled - http://looselycoupled.com/glossary/azindex.html

ABOUT ENTERPRISE TECHNICAL REFERENCE MODEL – VERSION 3.0

Version 3.0 of the Enterprise Technical Reference Model incorporates Disciplines, Technology Areas and Technology Specifications for the Information, Application, Integration and Security Domains. It also includes a conceptual architecture diagram that provides a high-level visual representation of the Service Oriented Architecture. The content introduced in version 2.0 for the Access and Delivery Domain remains unchanged.

ETRM version 3.0 has been reformatted to improve accessibility and navigation. The Introduction and the various Domains are now split up into separate documents that can be viewed and downloaded separately.

While this version expands the content published in version 2.0, the development of the architecture is a work in progress and there are still areas that are not covered in this version. Where possible, placeholders have been included to indicate where additional content will be developed in future versions.

VISION

Adopting a consistent architectural framework against which agencies' information technology development efforts can be reviewed and validated will further the following enterprise goals:

[1] This document is not to be interpreted to require any agency to acquire or use goods bearing any particular trademark or trade name or subject to any patent. Any references herein to a particular trademark, trade name, or patent are included only because there is no other sufficiently precise or intelligible way of describing agencies' procurement choices. Such references are to be interpreted to permit agencies to use any number of optional technologies including the specified trademarked, trade named or patented formats referenced herein or their equivalents.

- Ease of integration of applications, application services and data to enable inter-agency collaboration and sharing.
- Increase level of application interoperability within the Commonwealth, with other states and municipalities, and with the Federal government.
- Better responsiveness to changing business needs and rapidly evolving information technologies.
- Faster deployment of new applications.
- Efficient sharing and re-use of current information technology assets.
- Expand the consideration of possible alternatives as part of a best value evaluation of potential information technology solutions.
- Reduce the level of resources and costs required to develop, support and maintain government applications.
- Enable the consolidation of the state's information technology infrastructure to reduce costs, improve service levels, and increase operational flexibility across the enterprise.

TARGET STATE

Implementation of the ETRM will result in a Service Oriented Architecture for the Commonwealth that uses open standards solutions where appropriate to construct and deliver online government services. Agencies are expected to migrate towards compliance with the ETRM as they consider new information technology investments or make major enhancements/replacement to existing systems.

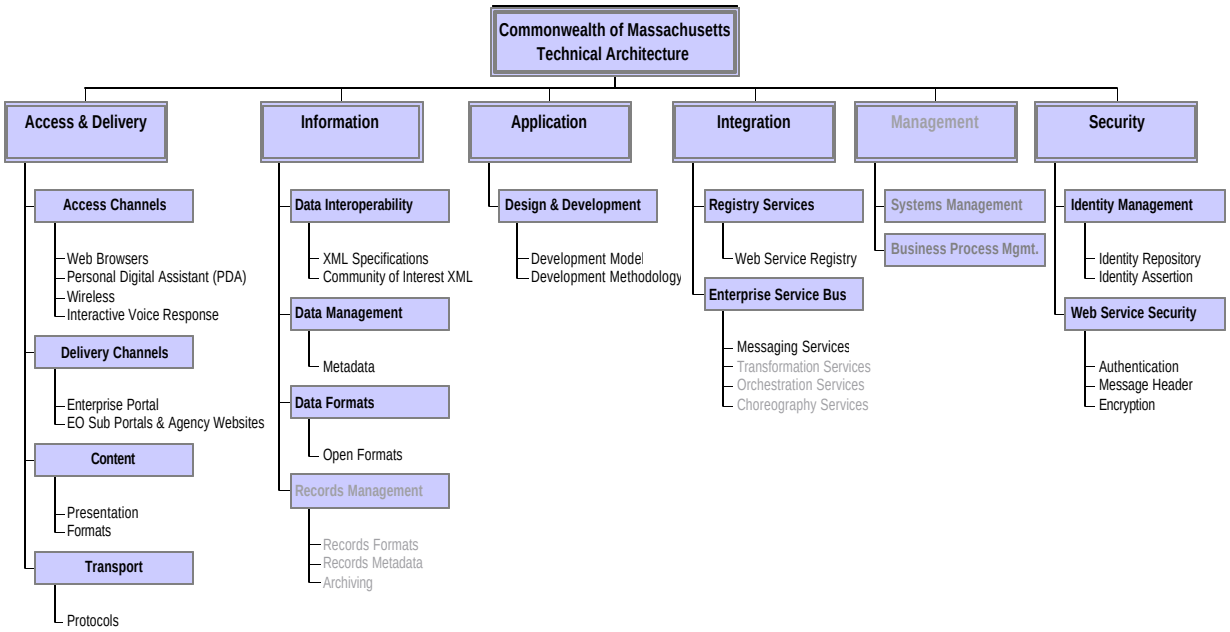
ROADMAP

The Commonwealth is transitioning from siloed, application centric and agency centric information technology investments to an enterprise approach where applications are designed to be flexible, to take advantage of shared and reusable components, to facilitate the sharing and reuse of data where appropriate and to make the best use of the technology infrastructure that is available. The technology specifications and standards detailed in this document are required to achieve the desired target state of a Service Oriented Architecture. These specifications and standards are required for all new IT investments.

Given the current state, there will be a period of transition required to fully implement the target architecture. Each Domain and Discipline detailed in this document includes a high-level roadmap that addresses current state - where we are today - and target state - where we need to get to – for each Domain and Discipline of the architecture. In addition, migration strategies that agencies need to consider and put in place now in order to make progress towards the target architecture are included for Technology Areas as appropriate.

BUILDING BLOCKS

Summary of Domains, Disciplines & Technology Areas



The ETRM specifies standards, specifications and technologies for each layer or area of the Service Oriented Architecture. For ease of reference, each area and its various components are organized into the following building blocks:

- Domains: Logical groupings of Disciplines that form the main building blocks within the technical architecture.
- Disciplines: Logical functional areas addressed within each domain as part of the architecture documentation.
- Technology Areas: Technical topics that are relevant to each Discipline
- Technology Specifications: Sets of product standards, protocols, specifications or configurations associated with each Technology Area.

The Domains, Disciplines, Technology Areas and Technology Specifications are defined and described in detail in this document. The following chart provides both a summary and a convenient way to navigate the rest of the document through hyperlinks.

SUMMARY OF DOMAINS, DICSIPLINES, AND TECHNOLOGY AREAS

Below is a listing of Domains and their respective Disciplines and Technology Areas. Items in gray will be addressed in future versions of the ETRM.

Domains	Disciplines	Technology Areas
Access and Delivery	Access Channels	Web Browsers
		Personal Digital Assistant (PDA)
		Wireless
		Interactive Voice Response (IVR)
	Delivery Channels	Enterprise Portal
		Executive Office Sub Portals & Agency Websites
	Content	Formats
	Transport	Protocols
Information	Data Interoperability	XML Specifications
		Community of Interest XML
	Data Management	Metadata
	Data Formats	Document Formats
	Records Management	Records Formats
		Records Metadata
		Archiving
Application	Design and Development	Development Model
		Development Methodology
Integration	Registry Services	Web Service Registry
	Enterprise Service Bus	Messaging Services
		Transformation Services
		Orchestration Services

	Enterprise Service Bus (cont.)	Choreography Services
Management		
Security	Identity Management	Identity Repository
		Identity Assertion
	Web Service Security	Authentication
		Encryption
		Message Header

SUMMARY OF TECHNOLOGY SPECIFICATIONS

Below is a listing of the various Technology Specifications corresponding to each Technology Area including standards, protocols, specifications and configurations. Items in gray will be addressed in future versions of the ETRM.

Technology Areas	Technology Specifications
ACCESS AND DELIVERY	
Web Browsers	▪ Must support 128 bit encryption and X.509 v.3 digital certificates
Enterprise Portal	
Executive Office Sub Portals & Agency Websites	▪ Java Specification Request (JSR) 168 for J2EE based applications ▪ C# Portlets for .Net based applications ▪ Web Services for Remote Portal (WSRP) v. 1.0 for web services
Formats	▪ Hypertext Markup Language (HTML) v. 4.01 ▪ Extensible Markup Language (XML) v. 1.0 (Third Edition) or v 1.1 when necessary
Protocols	▪ Hypertext Transfer Protocol (HTTP)/1.1 ▪ Secure Hypertext Transfer Protocol (HTTPS) – SSL, minimum 128 bit key length ▪ Simple Object Access Protocol (SOAP) v. 1.2
INFORMATION	
XML Specifications	▪ Extensible Markup Language (XML) v. 1.0 ▪ XML Schema Part 1: Structures and XML Schema Part 2: Datatypes ▪ Extensible Stylesheet Language (XSL) v. 1.0 ▪ XML Query Language (XQUERY) 1.0
Community of Interest XML	▪ Global Justice XML Data Model (Global JXDM) v. 3.0.2
Metadata	▪ Web Service Description Language (WSDL) v. 1.1

Technology Areas	Technology Specifications
Open Formats	▪ Rich Text Format v. 1.7 (.rtf) ▪ Plain Text Format (.txt) ▪ Hypertext Document Format (.htm) ▪ Portable Document Format (.pdf) – Reference version 1.5 ▪ Open Document Format for Office Applications (OpenDocument)* ▪ MS Office XML Document Formats * Pending final approval by OASIS expected in 2005
APPLICATION	
Development Model	▪ Interoperability Basic Profile (WS-I Basic Profile) v. 1.0
Development Methodology	▪ Unified Process (UP)
INTEGRATION	
Web Service Registry	▪ Universal Description, Discovery and Integration (UDDI) v. 2.0
Messaging Services	▪ Java Messaging Service (JMS) v. 1.1 ▪ Simple Object Access Protocol (SOAP) v 1.1
MANAGEMENT	
SECURITY	
Identity Repository	▪ Lightweight Directroy Access Protocol (LDAP) v. 3.0
Identity Assertion	▪ Security Assertion Markup Language (SAML) v. 1.1
Web Service Authentication	▪ XML Signature
Encryption	▪ XML Encryption
Web Service Message Header	▪ WS-Security v. 1.0

CONCEPTUAL ARCHITECTURE